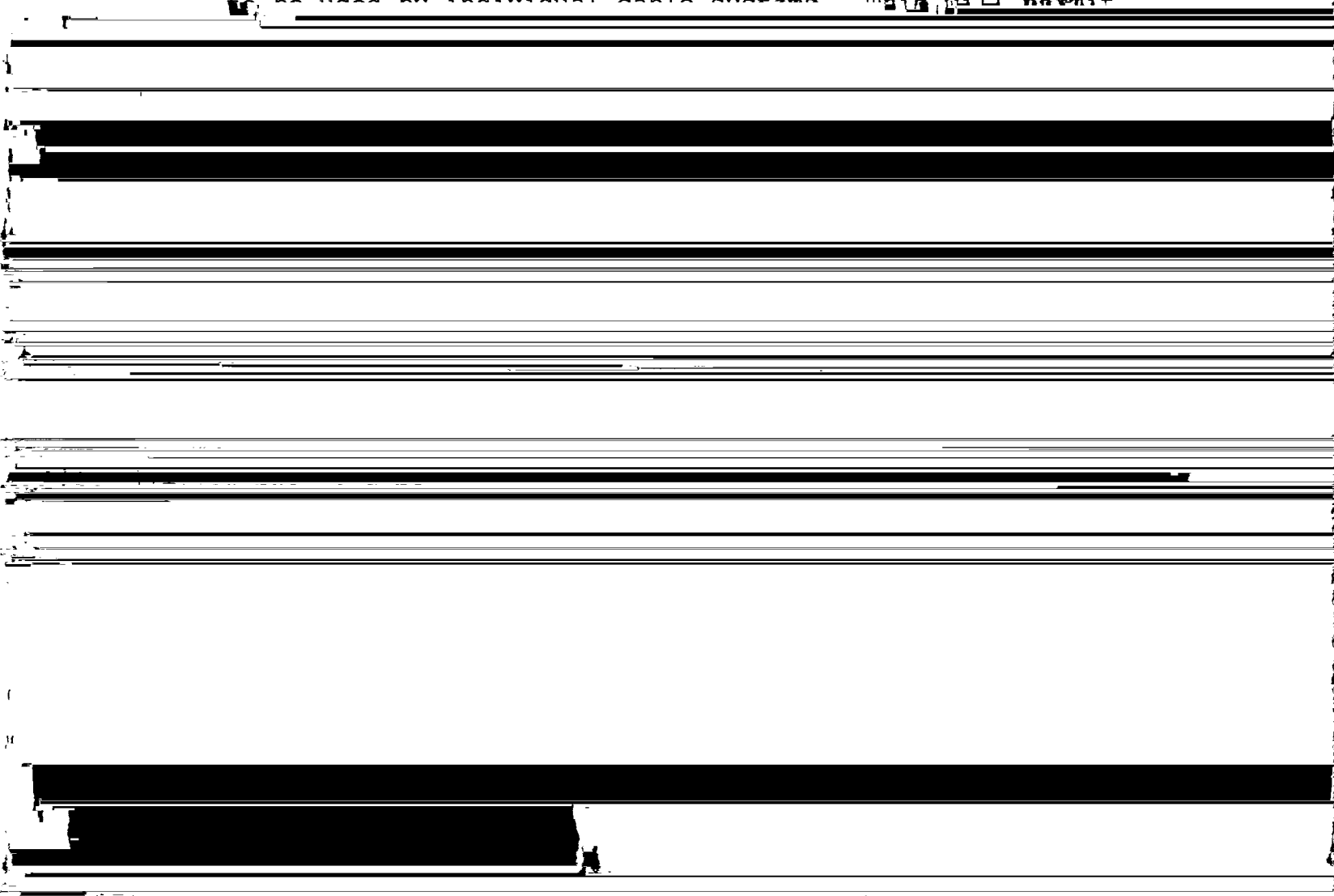


Fortunately, there are other cable security technologies that do not interfere with the operation of consumer electronics equipment.<sup>25</sup> In the short term, traps and interdiction appear to hold the most promise; multi-channel descrambling may also prove fruitful.<sup>26</sup> Later, if a digital standard for channelization and transmission is established, the need for security can be further addressed through the inherent flexibility of the digital domain. A standardized national renewable security system can be implemented, allowing system-specific scrambling algorithms to be used by individual cable systems. This will permit



local control to limit signal access to paying subscribers, with the advantage of common designs for TV receivers and VCRs that can be used anywhere in the country.<sup>27</sup> In short, with cooperation, technology can solve compatibility problems.

V. Features of Consumer Equipment and Attributes of "Cable Ready" Products.

As we answer the questions posed in Paragraph 13 of the Notice, it is important to begin with a general characterization of the market for consumer electronics products. This is an intensely competitive market, one with continuous innovation, low prices, numerous choices, and multiple suppliers.<sup>28</sup> These market characteristics are ideal for maximization of consumer welfare.<sup>29</sup>


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<sup>27/</sup> A national renewable security system (perhaps based on "smart card" technology) would permit the necessary descrambling capability to be incorporated directly in TVs and VCRs and other consumer electronics equipment. See, e.g., "Engineers Deal with Smart Cards," Multichannel News, at 24 (Feb. 1, 1993) (Director of Technology Assessment for CableLabs says "Smart card is likely to become an essential technology for pay-per-view and other interactive services on cable over this decade.").

<sup>28/</sup> "The television market is very price-sensitive, and profit margins for all television receivers manufacturers are very low. Only by maintaining large volumes of production and large market shares are companies able to remain profitable. In some cases, even large production volumes are insufficient." Office of Technology Assessment, International Competitiveness in Electronics, at 3 (Nov. 1983). Since the quoted report was written, profitability of the industry has continued to deteriorate.

<sup>29/</sup> A recent survey concluded that consumers regard television sets as being among the best values of all products and (Footnote 29 continued on next page)

The Notice asks what features in consumer electronics equipment can be affected by the manner of cable signal delivery. Our view is that all TVs and VCRs have features that are affected by cable scrambling and the concomitant requirement for cable company-supplied converter boxes. In this regard, the key features to bear in mind are the channel selector (this becomes useless if the TV or VCR is always tuned to the channel frequency of a converter box



and VCRs have channel selectors. Almost all TVs and VCRs (except for small size TVs) are currently sold with remote controls (but there probably remains a substantial population of TVs which do not have remote control capabilities). Picture-in-picture is now incorporated in over 20 percent of all new TVs sold, and this feature is now found in approximately 10 percent of all U.S. households. On-screen programming capabilities for timed recording are incorporated in virtually every VCR. Yet almost 80 percent of VCR users with converter boxes must use these boxes to select channels for recording.

The Notice asks how many channels can be accepted by currently available "cable-ready" equipment. Today's equipment generally can receive 125 channels, including HRC (harmonically related carriers) and IRC (incrementally related carriers) cable channels.<sup>30</sup> Of course, because the number of channels used in cable systems has changed repeatedly, there are older TVs and VCRs, which were "cable-ready" at the time they were manufactured, that accept smaller numbers of channels. This and other compatibility problems discussed in these comments have caused most, if not all, TV manufacturers to discontinue use of the term

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<sup>30/</sup> In response to the Commission's specific question, the video carriers range from 55.25 MHz through 799.25 MHz. Respective aural carriers are 59.75 MHz through 803.75 MHz. HRC systems have a -1.25 MHz offset.

"cable-ready" (and of similar terms such as "cable-compatible") in marketing their products. Regardless of the tuning capacity of TVs and VCRs, a very substantial number of these products are tuned exclusively to a single channel -- Channel 3 or 4 -- because that is what is dictated by the cable company's converter box.

Other consumer electronics equipment functions are also susceptible to disruption as a result of signal delivery via cable. Scrambling systems may make it more difficult to locate closed-captioning information, although the Commission has attempted to address this by way of specific allocations of responsibilities to both industries.<sup>31</sup> No similar measures have been adopted to avert incompatibility problems in the case of teletext, extended data services, and ghost-cancellation circuitry (all of which use the vertical blanking interval), electronic program guides and other new features expected in consumer products (as discussed below).

The Notice inquires how "cable compatible" or "cable-ready" ought to be defined.<sup>32</sup> This subject is currently under review by the Joint Engineering Committee. Discussions focus on such distinct technical issues such as

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<sup>31</sup>/ See 47 C.F.R. §§ 15.119(1), 76.606 (1992).

<sup>32</sup>/ Defining these terms is a specific requirement of the legislation. Communications Act of 1934, § 624A(c)(2)(A).

tuning range, noise figure, local oscillator leakage, direct pick-up, reradiation, channelization, and signal level range.

We recognize that some cable companies favor a more expansive definition of "cable-ready." In this regard, the Commission should consider that the Cable Act does not require manufacturers to offer "cable-ready" products, only that they comply with criteria to be established by the Commission if they wish to use that phrase in marketing their products.<sup>33</sup> Expanding the definition of cable-ready would create disincentives for the manufacture of "cable-ready" products and make the establishment of a definition a meaningless gesture.

In any event, the problem is not that consumer electronics products are not "cable-ready" but that cable systems are increasingly incompatible with consumer electronics products. Unless the characteristics of the cable systems are stabilized, any definition of the term "cable ready" for consumer electronics products will quickly become obsolete.<sup>34</sup> Therefore, a meaningful solution to the

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<sup>33</sup>/ Communications Act of 1934, § 624A(C)(2)(A).

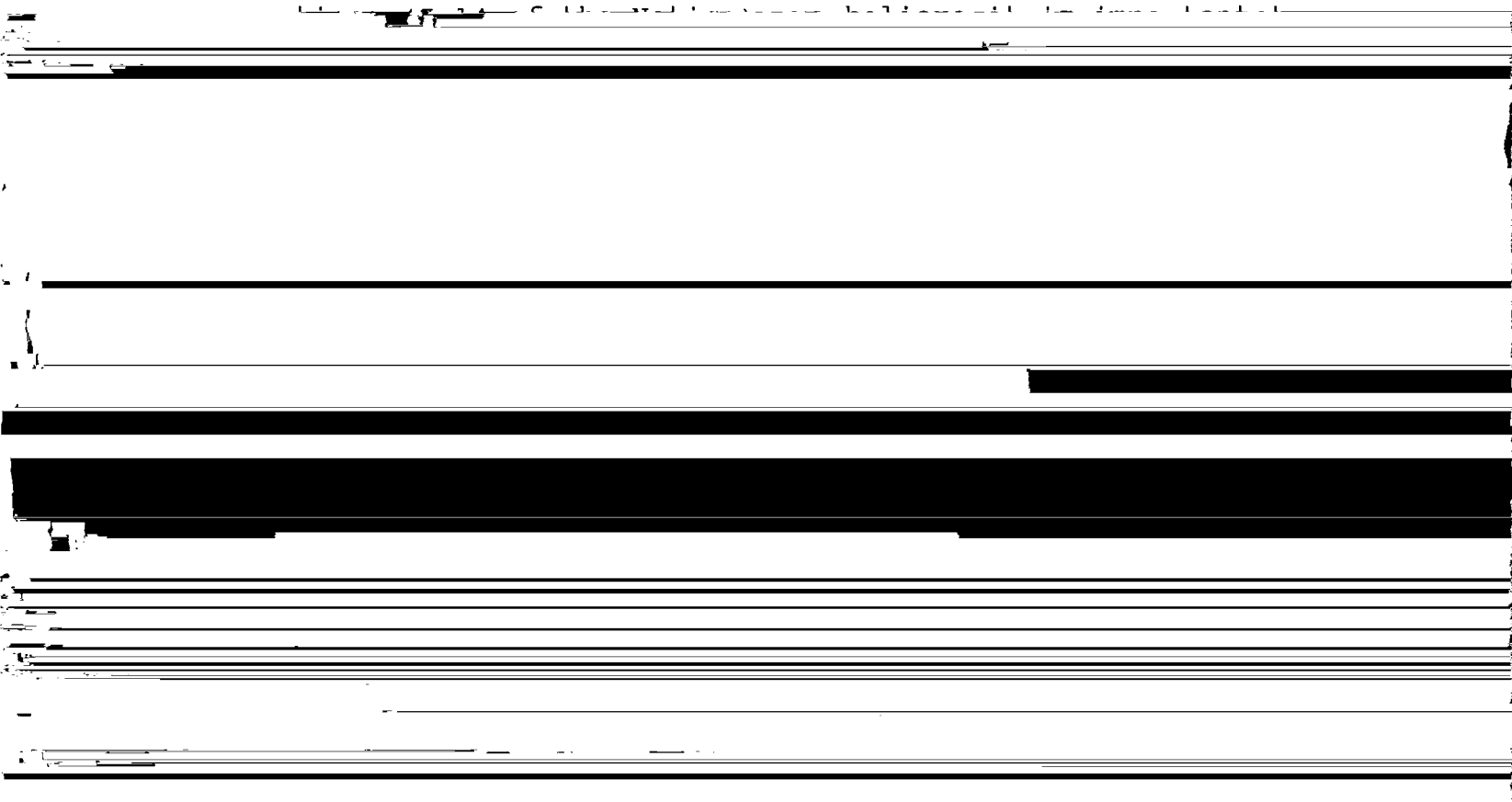
<sup>34</sup>/ The real problem is much greater than the potential obsolescence of the definition. As one article described the situation, "TV set of future could be gutless wonder without remote control, on-screen menus or other step-up features if current trends continue. Set of future would be designed to pick up only Ch. 2 and 4 for connection to

definitional problem requires a stable notion of the cable environment.<sup>35</sup> Equipment cannot be "compatible" unless regulations specify the present and future characteristics of cable services.<sup>36</sup> Thus, the best solution to the "cable-ready" problem requires attention to both sides of the interface; there is no point in addressing consumer electronics equipment in isolation.

If the cable side of the equation is properly addressed, the consumer electronics industry will move quickly -- pushed by intense competitive pressures -- to adopt corresponding measures.

VI. Regulatory Options, Including Possible Changes in Cable Company Practices and in Consumer Products.

At the outset of our discussion of regulatory



compatibility to either industry. Nonetheless, we feel strongly that the burden must be carried primarily by the cable industry.

In this regard, two considerations are most important. First, as previously noted, the consumer electronics industry is competitive, while cable service is almost invariably provided on a monopoly basis, making imposition of regulatory burdens much more appropriate in the latter situation. Second, there is nothing practicable that the consumer electronics industry can do to ease the compatibility problems already facing the 300 million TVs and VCRs currently in use in the United States, or even future TVs and VCRs, so long as the cable industry continues changing the characteristics of its cable systems in ways that exacerbate compatibility problems or create new ones.<sup>37</sup> Any effort to solve compatibility problems by requiring changes in the design of TVs and VCRs alone would be slow to

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<sup>37/</sup> Consumer electronic products are durable goods. Television sets, in particular, tend to last a considerable period: 15 years on average. Market Facts, Inc., "EIA Color Television Replacement Cycle Study," at 40-41 (Apr. 1985). By contrast, cable plant is "continually" being revised, with full system rebuilds "every six or seven years." NCTA, A Cable Television Primer, at 21 (1990). IRS depreciation schedules and FCC technical standards are predicated on expectations of complete replacement of converter populations within seven years. Cable Television Technical and Operational Requirements, 7 FCC Rcd. 8676, 8678 (¶ 11)(1992).



have an impact because of the substantial time needed to achieve significant penetrations in the marketplace.<sup>38</sup>

We recognize that the cable industry has a legitimate need to prevent unauthorized reception of service and that the Cable Act specifically requires this need to be taken into account.<sup>39</sup> The Commission's goal, accordingly, should be to canvass all potential means of preventing piracy and evaluate them for their effects on compatibility.<sup>40</sup> If, as we believe, piracy can reasonably be prevented without causing consumer electronics compatibility problems,<sup>41</sup> that should point the way for

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<sup>38/</sup> By the time most of the TVs and VCRs in use today in American homes are retired, it will be close to the year 2008, which is the date by which the Commission plans to discontinue NTSC broadcasting. Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service, 7 FCC Rcd 6924, 6957-6964 (1992).

<sup>39/</sup> Communications Act of 1934, § 624A(b)(1) & (2).

<sup>40/</sup> Of course, since the cable industry claims it is losing almost \$5 billion annually to piracy, a new approach need not provide perfect protection to represent an improvement over the status quo. (We have not independently evaluated the losses to the cable industry resulting from piracy.)

regulatory implementation of Section 17.<sup>42</sup>

The legislation expressly empowers the Commission to forbid scrambling or to decide to what extent it may be used.<sup>43</sup> Our current view is that traps, interdiction, broadband descrambling, and -- further in the future -- a national renewable security standard all provide ways to prevent piracy while avoiding compatibility problems.

As noted above, the installed base of existing consumer electronics equipment leads us to believe that the core problems of compatibility must be addressed by changes in the practices of cable systems -- and in a manner which restores compatibility with the installed base of subscriber equipment, not just with new equipment. "Point-of-entry" solutions appear to hold the most promise since these methods simultaneously present all authorized program channels to the consumer's equipment and allow use of all features of that equipment. We understand that there are several approaches to deliver in-the-clear signals to the

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<sup>42/</sup> Congress agrees: "cable operators should use technologies that will prevent signal thefts while permitting consumers to benefit from [new and innovative] features and functions in [TV] receivers and [video cassette] recorders. Communications Act of 1934, § 624A(a)(3).

<sup>43/</sup> Communications Act of 1934, § 624A(b)(2). The only limitation is that the Commission cannot limit the use of scrambling or encryption "where the use of such technology does not interfere with the functions of subscribers' television receivers or video cassette recorders." Id.

consumer. Two of these are interdiction techniques and broadband descrambling methods.

With interdiction, all signals are delivered throughout at least a portion of the cable system's configuration without scrambling, and non-authorized programs are rendered unviewable just prior to the subscriber's drop. This understandably raises security concerns in the minds of some cable operators: concerns about intentional unauthorized reception of those signals prior to the interdiction function. Other cable operators, however, have reported favorable experiences with interdiction techniques, most notably in increased subscribership rates for both basic and pay services and improved customer satisfaction.<sup>44</sup>

Interdiction technology is continuing to advance. For example, new technologies now allow for interdiction to be applied on an "addressable" basis, thereby allowing for delivery of pay-per-view events and for compliance with "anti-buy-through" requirements. Also, these technologies allow for larger numbers of channels to be interdicted and for the interdiction to be accomplished without causing existing TV receivers to experience performance problems.

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<sup>44</sup>/ "Interdiction Case Study," Communications Engineering and Design, at 54-61 (Nov. 1991). See also supra note 26.

Unlike interdiction, which is already well-developed and in use in various systems around the country, broadband descrambling is still under development. We understand, however, that the technique has been shown to be technologically viable. With broadband descrambling, the program signals are delivered through the cable system in scrambled form, thereby reducing dangers of service theft, but are descrambled by a box at the point of entry to the consumer's premises. All authorized signals are descrambled (in contrast to the one-at-a-time approach of a converter box), so the cost, clutter, and incompatibility problems associated with the converter box are all eliminated. Like Senator Leahy, we believe continued use of cable converter boxes represents the principal source of consumer dissatisfaction.

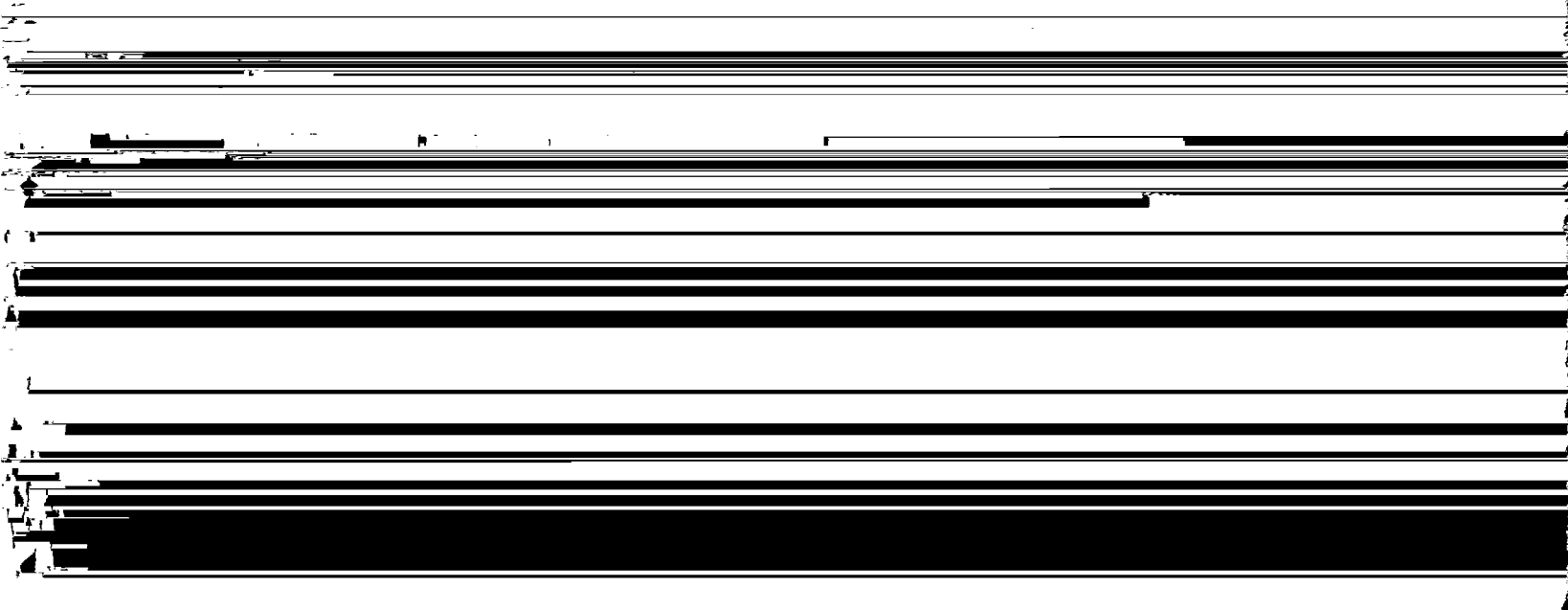
Both interdiction and broadband descrambling warrant careful consideration as relatively near-term solutions to compatibility problems.<sup>45</sup> For the longer term, the advent of digital signal transmission presents a major new challenge -- and a new opportunity. Fortunately, cable

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<sup>45/</sup> Necessary related matters include prescription of standards governing the characteristics of the signals delivered to subscribers. Our tentative view is that cable operators should be required to deliver a signal that complies with the NTSC standard, just as are terrestrial broadcasters today, see 47 C.F.R. § 73.682 (1992), except where the characteristics of the cable environment specifically require a different approach (sound carrier, HRC and IRC channels), see 47 C.F.R. § 76.605 (1992).

systems are just beginning to deploy digital transmission technologies, so prompt action now can prevent additional compatibility problems from developing (see discussion below in Section VIII). In conjunction with the development of a single national standard for digital transmission of television signals, the Commission can also explore establishment of a national renewable security standard, one that would entail decoding within the consumer electronics equipment and authorization by way of "smart cards" or other new technologies.

We are decidedly less enthusiastic about proposals to modify "existing consumer TV equipment designs to make [consumer products] more compatible with the manner in which cable service is provided." Notice at ¶ 14. With rare exceptions,<sup>46</sup> policymakers have not found it necessary to prescribe the characteristics of consumer electronics products; the spur of competition has a proven record of delivering the requisite capabilities. As a matter of logic, it is more appropriate to regulate the behavior of



Thus, the Commission's rules properly prescribe the characteristics of the signals transmitted by AM radio, FM radio, and television broadcasters, not the design of the products which receive those signals; the existence of a standard for the transmitted signal has proved to be sufficient.

We understand that some in the cable industry may advocate revival of the "Multiport" or some similar interface. This would relate to what the Notice describes as "[a] universal connection to enable the use of separate devices that can descramble signals encoded using alternative security techniques." A complete response can be deferred until there is a specific proposal to respond to, but it is timely to identify several concerns about this proposal.

First, as a matter of history, the Multiport standard developed several years ago by the cable and consumer electronics industries (EIA-563) failed because of lack of support from the cable industry, not the consumer electronics industry. As a senior spokesperson for NCTA has acknowledged, "TV set manufacturers 'deserve great credit because they stepped forward and took the risk'" of implementing Multiport in hundreds of thousands of receivers (at a cost of millions of dollars) but "'cable equipment

manufacturers didn't embrace it with great verve.'"47

Second, any decoder interface (whether the original Multiport or some updated variation of it) adds some cost to the price of every TV or VCR, whether or not the consumer intends to connect those products to cable.<sup>48</sup> These costs may be difficult to recover in an industry where competition is cutthroat and margins are notoriously thin, especially where the consumer does not benefit from the value added.<sup>49</sup> Third, Multiport is no longer compatible with the full panoply of scrambling systems used by cable operators today and provides no basis for handling the digital signals of tomorrow.<sup>50</sup>

Fourth, and perhaps most importantly, even if all these problems could be eliminated, no decoder interface can do anything to restore compatibility for the massive

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47/ "Digital Compression Makes 'Cable-Ready' TV Issue More Urgent," Communications Daily, at 1 (Nov. 15, 1991).

48/ Tens of millions of American households are "passed" by cable but choose not to subscribe. Increased numbers may decide to "opt out" once alternative video delivery media, such as Direct Broadcast Satellite ("DBS"), become marketplace realities.

49/ Moreover, the additional costs would represent a proportionately larger increment with respect to the lowest priced products. This may present special problems for the least fortunate members of society. Even in cabled homes, with multiple sets, extra TVs used in kitchens, children's rooms, etc. are often low-cost devices, and increases in the prices of these products would be unwelcome.

50/ We believe that most in the cable industry recognize the obsolescence of EIA-563.

embedded base -- the hundreds of millions of TVs and VCRs currently in use in households across the country. Even if such an interface added no additional cost, even if it accommodated all scrambling systems currently in use, even if the design of every model of TV and VCR could be altered overnight to incorporate a multiport, and even if cable companies -- this time -- would universally agree to support



retired). By the time these developments occur, the scheduled date for the termination of NTSC may be at hand.<sup>52</sup> Surely Congress intended that actions be taken now to address existing compatibility problems, and to provide some relief to owners of existing equipment.

By no means do we mean to foreclose the possibility of any joint industry efforts which focus on improvements in consumer electronics products as well as changes in cable system operations. Consumer electronics manufacturers recognize the value of improving interference and tuning performance in TVs and VCRs. EIA/CEG is already addressing these issues through development of voluntary national standards.<sup>53</sup> Fundamentally, however, the problems Section 17 sought to remedy must be addressed by modifying cable operators' behavior.

We believe that cable systems should control authorization at the point of entry to the subscriber's premises and provide simultaneous "in the clear" delivery of all authorized channels to the subscriber's TV or VCR.

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<sup>52/</sup> Over the same period, it is possible that new, non-standard digital systems could be in widespread use.

<sup>53/</sup> Interim Standard IS-6 is being promulgated as a full EIA/ANSI standard detailing the channelization of TVs and VCRs for the cable environment. The Joint Engineering Committee of EIA and NCTA is revising this standard to incorporate a higher frequency range, consistent with cable capabilities, and is pursuing standardization of receiver immunity to direct pickup interference and various tuner performance criteria.

Traps and interdiction systems are available today to accomplish this function.<sup>54</sup> Other systems (such as broadband descrambling) are currently under development and they probably could be available sooner than multiport interfaces could be designed into TV receivers and VCRs. Over the longer term, a national standard for the digital environment is absolutely essential to prevent compatibility problems from growing steadily worse.

We should also acknowledge here that other regulatory issues germane to the competitive supply and compatibility of consumer electronics products are presented in separate Cable Act proceedings before the Commission. The rate regulation proceeding (MM Docket No. 92-266) is important because of the need to eliminate artificial economic incentives for cable operators to require the use of converter boxes, or to hinder subscribers from using their own remote controls. The tier buy-through proceeding (MM Docket No. 92-262) is important because, as cable and consumer electronics interests participating in that docket agreed, some solutions to buy-through problems could exacerbate compatibility problems. The cable home wiring proceeding (MM Docket No. 92-260) is important because it

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<sup>54/</sup> We also believe that dual-tuner converters could serve as an adjunct to the other measures, if used only at the subscriber's option. The additional tuner, however, adds appreciable cost to the converter.

can serve as the basis for a forward-looking regulatory scheme that ends the cable companies' monopoly at the entry to the subscriber's premises, and allows for competitive market forces to dictate the price, features, characteristics and use of home wiring and home equipment.

VII.        Remote Controls.

The joint EIA/CEG-NCTA submission addresses the factual questions posed in Paragraph 16 of the Notice. The last question, however, involves more subjective considerations: "how can the Commission best encourage the commercial availability of remote control units that are compatible with existing converter boxes?" Several points need to be made in response.

First, one easy, but essential, step is to forbid cable companies from disabling their converter boxes from responding to remote controls. Certain models of addressable converters can be controlled from the cable head-end so as to foreclose use of a remote control; apparently, some cable companies have used this power to force subscribers to rent cable company-supplied remotes instead of commercially available units.<sup>55</sup> This practice is

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<sup>55/</sup> A cable industry publication notes that cable operators charge their subscribers "about \$4 a month" for remote controls, even though "universal remotes can be purchased at retail outlets for \$30 to \$40." A senior cable industry official is quoted in the same article as saying, with respect to promotion of commercial availability of remote (Footnote 55 continued on next page)

clearly anticompetitive and should be outlawed.<sup>56</sup>

Second, cable companies must be required to disclose any information needed to permit successful interoperation between converter boxes and remote controls. Manufacturers of converter boxes should provide, and the Commission should compile and publish, a complete listing of IR codes to enable such interoperation.<sup>57</sup>

Third, as a general proposition, we believe new codes should not be used to control existing functions (channel numbers, volume control, and the like) and that any new codes and provision for expansion should be developed through ANSI-accredited forums.<sup>58</sup> This approach will help

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(Footnote 55 continued from previous page)

controls: "Operators must replace those remote control revenues, or there is no incentive to go along . . . , especially since remote control revenue is still growing." "\$600M in Revenue at Stake on 'Compatibility,'" Multichannel News, at 31 (Oct. 19, 1992).

56/ Congress has instructed the Commission to "prohibit a cable operator from taking any action that prevents or in any way disables the converter box supplied by the cable operator from operating compatibly with commercially available remote control units." Communications Act of 1934, § 624A(c)(2)(E).

57/ This would help to fulfill the legislative directive that the Commission "promote the commercial availability, from cable operators and retail vendors that are not affiliated with cable systems, of . . . remote control devices compatible with converter boxes." Communications Act of 1934, § 624A(c)(2)(C).

58/ EIA's recently completed Consumer Electronics Bus ("CEBus®") standard, to be submitted to ANSI for approval as a National Standard, includes provisions for infrared remote controls, based on industry agreement.

to avoid causing uncontrolled obsolescence of competitively supplied remotes.

It is important to emphasize that the legislation requires that regulations "promote the commercial availability" not just of remote controls but also of "converter boxes."<sup>59</sup> For the reasons discussed above, we hope that the Commission's efforts to "assure . . . compatibility" between consumer electronics equipment and cable systems will cause use of converter boxes to be eliminated. Nonetheless, in the interim, it would appear that the Commission must adopt and enforce regulations to ensure the availability of converter boxes from independent sources.

The multiplicity of converter types<sup>60</sup> and the need to control distribution of descrambling converters to ensure that they are sold only to authorized users represents a substantial obstacle to efforts to promote independent distribution. Inventory costs and the measures needed to prevent converter boxes from being used for theft of service may make the cost to the consumer unreasonably high.<sup>61</sup>

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<sup>59</sup>/ Communications Act of 1934, § 624A(c)(2)(C).

<sup>60</sup>/ There are about 12 different, incompatible scrambling systems in current use by the cable industry. A single system may have numerous variations, any one of which may be used by a single local cable operator.

<sup>61</sup>/ There is also a danger that poorly designed converters may themselves become a source of performance and compatibility (Footnote 61 continued on next page)

These considerations present substantially less of a problem in the case of non-descrambling converters, such as may be used for tuning and direct pick-up reasons. For these devices, unbundling of rates and standardization of channelization and channel mapping appear to be the most important steps toward the objective of promoting "commercial availability." Still, the Commission's primary efforts should be focused on approaches to compatibility issues that eliminate the need for converter boxes to the maximum extent possible.

VIII. Future Developments in Cable Distribution Techniques and in Consumer Electronics Products.

Paragraph 17 of the Notice inquires about "likely future developments in cable television distribution techniques and [in] consumer electronics . . . ." This is the one question as to which we can be more specific in discussing the cable industry than in discussing the

manufacturers tend to be much more guarded in announcing their future intentions in ways that could be exploited by their competitors.

Cable. The future cable developments which hold the greatest potential for adverse effects on compatibility of consumer electronics equipment are expansion of channel capacity via use of increasingly higher frequencies for analog transmission and introduction of digital transmission and compression techniques. As previously noted, cable operators repeatedly have increased the number of analog channels they deliver, each time changing what were "cable-ready" sets into "cable-unready" sets. So long as channels are added beyond the tuning range of cable-ready TVs and VCRs, this problem will persist, and some point-of-entry or customer-premises device will be needed to convert the higher frequency signals to channels the VCR or TV can receive.

The introduction of digital transmission and compression techniques will have an even more dramatic effect: any existing analog interface would become obsolete immediately.<sup>62</sup> Once again, a new set-top box or point-of-

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<sup>62/</sup> The Commission should not overlook the value of having consumer electronics products designed successfully to receive signals from multiple media. Surely it is important to the health of terrestrial broadcasting that consumers be able to use their equipment for off-air reception if that is their choice. And competition in the delivery of pay services (i.e., alternatives to cable) can best be promoted (Footnote 62 continued on next page)

entry processor would be required.<sup>63</sup> What is worse, early discussions with the cable industry on this subject suggest that there is no interest in adopting a standard digital transmission and compression scheme; various cable companies apparently wish to retain the right to use their own unique digital transmission and compression schemes, irrespective of the potential adverse effects on the ability of manufacturers to design standardized TVs and VCRs.

EIA/CEG believes that this would disserve consumers and thwart congressional intent. Accordingly, we believe that the Commission should exercise its power to forbid scrambling,<sup>64</sup> unless and until the cable industry agrees to adopt a single standard for cable-delivered

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(Footnote 62 continued from previous page)  
if the same equipment can be used to work with other delivery sources.

63/ This, in turn, would compound existing problems of (1) how to ensure the commercial availability of set-top devices and (2) the negative effects on TV and VCR functions of limiting the number of "in-the-clear" channels passed through to the TV or VCR.

64/ The Commission is empowered to "determine whether and, if so, under what circumstances to permit cable systems to scramble or encrypt signals or to restrict cable systems in the manner in which they encrypt or scramble signals" except to the extent that such scrambling or encryption does not interfere with the functions of TVs and VCRs. Communications Act of 1934, § 624A(b)(2). Use of any digital transmission technology inherently entails a form of "scrambling or encryption," in the sense that existing TVs and VCRs cannot decode the signal which carries picture and sound information.



digital compression, transmission, and scrambling -- or until one is prescribed by the Commission.

The Commission is already working on establishment of a digital standard for advanced television. We believe that interoperability and competition -- and maximum use of user-friendly features on TVs and VCRs -- would be promoted by adopting harmonious standards for digital transmission of all video signals, whether by terrestrial broadcasters, telephone companies, cable companies, or otherwise, and whether the programming is high-definition television or a form of 525-line quality television. In the case of HDTV, a specialist group is working to ensure interoperability among terrestrial television, cable television, DBS, switched broadband fiber optics, and pre-recorded media such as video tape and video discs.<sup>65</sup>

As an interim matter, some in the consumer electronics industry believe that the Commission should consider prescribing a moratorium on the use of digital compression in cable systems. Such an action could prevent the development of a new generation of compatibility problems during the pendency of this proceeding. It might

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<sup>65/</sup> See Comments of United States Advanced Television Systems Committee, at 5, MM Docket No. 87-268 (Dec. 15, 1992). ATSC reports that "no insurmountable obstacles" have been encountered, in part because "[d]igital television is simply 'more interoperable' than is analog television." Id.